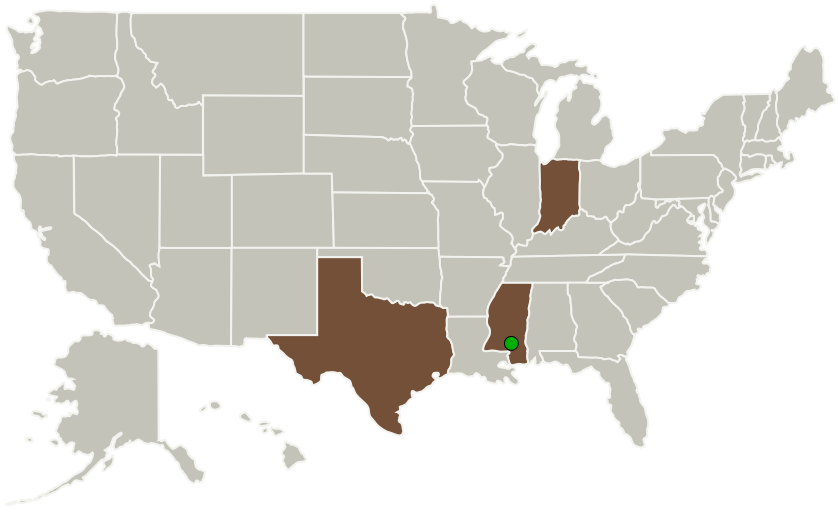
Intelligent Radiative Materials, Phase I

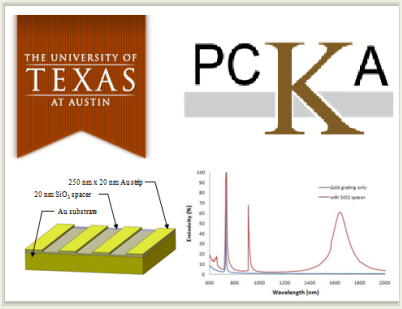
Completed Technology Project (2012 - 2013)

Project Introduction

An opportunity to boost energy efficiency in homes and buildings exists through the design of functional radiative properties in glass and other building materials. Current surface materials ignore or take first-order approaches to complicated spectral behavior, leading to sub-optimal properties. The sensitivity of material properties to microscale surface structuring creates a design challenge that has precluded this technology development, however the availability of high-performance computing hardware combined with sophisticated optimization algorithms now permits the engineering of such materials. PC Krause and Associates, Inc. (PCKA) and The University of Texas (UT) will target two candidate applications with high potential for environmental and commercial impact: variable emissivity materials, and reduced emissivity glass. Both of these target applications offers independent paths to energy efficiency, along with clear routes to commercialization. Variable emissivity materials will directly reduce energy costs in diurnal climates. Likewise, the reduction of infrared emission from glass windows would address one of the costliest thermal losses in buildings of all sizes.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
PC Krause and Associates, Inc.	Lead Organization	Industry	West Lafayette, Indiana
Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi
The University of Texas at Austin	Supporting Organization	Academia	Austin, Texas

Primary U.S. Work Locations	
Indiana	Mississippi
Texas	

Project Transitions

February 2012: Project Start

February 2013: Closed out

Closeout Summary: Intelligent Radiative Materials, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/138231)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

PC Krause and Associates, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Alexander J Heltzel

Co-Investigator:

Alex Heltzel

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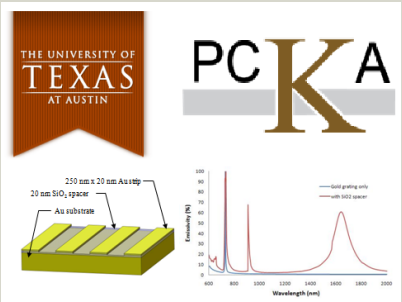
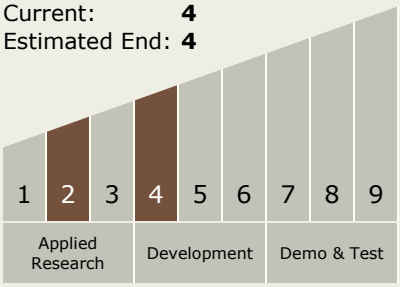
Images



Briefing Chart Image
Intelligent Radiative Materials, Phase I
(https://techport.nasa.gov/image/126214)

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.6 Materials for Electrical Power Generation, Energy Storage, Power Distribution and Electrical Machines

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System